C.14 Comparison of Alternatives

This section discusses the environmental impacts for each alternative associated with a particular issue area. The summary of alternatives comparisons in Sections C.14.1 through C.14.12 draw on the detailed discussions of the affected environment and environmental consequences of the alternatives in Section C, as well as the technical studies and other material in the appendices. The following alternative impact summaries are also presented in Table C.14-1, which identifies the key issues or concerns that distinguish each alternative.

C.14.1 Air Quality and Climate Change

C.14.1.1 Air Quality

Air Quality impacts associated with the proposed action (Project) and Alternative 1 would be identical during construction of the grade control structure, and also during operation and maintenance excavation activities when both the Project and Alternative 1 are forecast to have those activities. While Alternative 1 would reduce the number of daily truck trips and reduce the daily and annual air pollutant emissions during the excavation construction phase, the total number of days that activities would generate air pollutants is increased each year (into the months of July and August), and the number of years of the excavation construction phase would increase from the proposed 7 to 12 year period to a minimum of 13 years. Both the Project and Alternative 1 would have the same project commitments to reduce air pollutant emissions, and neither would require mitigation to reduce adverse impacts. The No Action/No Project Alternative, while having somewhat unknown construction specifics, would likely result in eventual demolition and removal of the Dam, which would generate air pollutant emissions similar to, but likely greater in quantity, than that of the Project or Alternative 1.

C.14.1.2 Greenhouse Gases

Greenhouse gas (GHG) emissions impacts associated with the proposed Project and Alternative 1 would be identical during construction of the grade control structure, and also during operation and maintenance excavation activities when both the Project and Alternative 1 are forecast to have those activities. While Alternative 1 would reduce the number of daily truck trips and reduce the daily and annual GHG emissions during the excavation construction phase, the total Project-life GHG emissions are forecast to be marginally higher for Alternative 1. Both the Project and Alternative 1 would have the same project commitments to reduce GHG emissions, and neither would require mitigation to reduce adverse impacts. The No Action/No Project Alternative, while having somewhat unknown construction specifics, may result in increased direct GHG emissions impacts during eventual demolition and removal of the Dam when compared to both the Project and Alternative 1. Further, the loss of the Reservoir under the No Action/No Project Alternative would not comply with GHG emissions reductions policies that seek to maximize local water resources and reduce the GHG emissions associated with long distance water importing.

C.14.2 Biological Resources

The proposed Project and Alternative 1 would have similar impacts for most of the biological resources present in the Project area. Alternative 1 would result in greater impacts to nesting birds because sediment removal activities would commence during the nesting season. Alternative 1 would also have greater impacts to aquatic species including arroyo toads, southwestern pond turtle, and two-striped garter snake than the Project because of the need to drain the Reservoir in June rather than after Labor

Day. Project activities conducted during July for Alternative 1 would also increase impacts to sensitive mammals. Impacts to sensitive biological resources that occur on the 47th Street East sediment removal site would be identical for the proposed Project and Alternative 1.

Implementation of the No Action/No Project Alternative would result in fewer impacts to biological resources compared to the proposed Project or Alternative 1. The No Action/No Project Alternative may benefit biological resources, over time, through the accumulation of sediment and the establishment of native riparian communities. The transition of the Reservoir to a more natural stream channel would reduce the presence of non-native fish and may increase habitat that would support arroyo toad. This assumes the Dam would not become unstable and require demolition. In the event the Dam and accumulated sediment must be removed, the extensive nature of the project (i.e., removal of approximately 2.8 million cubic yards of sediment and dam concrete) would contribute to greater impacts to native vegetation above and below the Dam compared to either the proposed Project or Alternative 1.

C.14.3 Cultural Resources

As noted above, impacts to cultural resources would be the same for the proposed Project and Alternative 1. The only potential for the proposed Project and Alternative 1 to have direct impacts to cultural resources is from unanticipated or inadvertent cultural resource discoveries. However, if such resources are encountered, impacts would be minimized through the implementation of SPC CUL-1 (Archaeological Monitoring Outside the Little Rock Creek and Reservoir Bed) and SPC CUL-2 (Unidentified Cultural Resource Discovery Procedures). No formal cemeteries or human remains are known to be located within the APE of the proposed Project and Alternative 1. However, there is always the possibility that unmarked burials may be unearthed during construction. In the unlikely event of an accidental discovery of any human remains, the procedures and provisions in SPC CUL-3 (Unidentified Human Remains Discovery Procedures) would be implemented.

Finally, under the No Action/No Project Alternative, the Project would not be implemented. Therefore, the impacts associated with the proposed Project and Alternative 1 would not occur and the Project would have no impacts to cultural resources. In the event sediment buildup led to safety issues and required demolition/removal of the Dam, it is likely similar procedures and provisions as SPCs CUL-1, CUL-2, and CUL-3 would be necessary to address inadvertent discoveries and provide detail on how these activities would be implemented.

C.14.4 Geology and Soils

The proposed Project and Alternative 1 both would have a direct and minor potential to expose construction workers to seismic and geologic hazards, such as landslide and liquefaction. This potential would be reduced through implementation of SPC GEO-1 (Geotechnical Investigation). No other adverse impacts associated with seismic hazards would occur. Under the No Action/No Project Alternative, future demolition of the Dam and earth movement on or near steeper slopes could expose construction workers to risks associated with liquefaction and landslide. The geotechnical safeguards for this potential demolition and excavation work are unknown, and therefore the No Action/No Project Alternative could result in a direct, adverse impact.

Both the proposed Project and Alternative 1 would have a direct but negligible potential to increase erosion and expose construction workers to unstable slopes. This potential would be reduced through implementation of SPC HYDRO-1 (Fill From Reservoir Excavation Will Not Be Placed in Stream Channels). Under the No Action/No Project Alternative, it is likely that substantial downstream erosion and

sedimentation would result in the event the Dam was breached or demolished. It is unknown what project commitments would be included in this alternative, or if they would be adequate to protect downstream resources from erosion and sedimentation. Therefore, this alternative would result in a direct and adverse impact.

C.14.5 Hazards and Public Safety

The proposed Project and Alternative 1 would have a direct and minor potential to contaminate water resources or endanger public health through the use and transport of hazardous materials. This potential would be reduced through implementation of SPC WQ-1 (Prepare Spill Response Plan). Under the No Action/No Project Alternative, future demolition of the Dam and sediment excavation would require the use of hazardous materials (e.g., vehicle fuels, oils, and other vehicle maintenance fluids). As standard project commitments regarding the handling, disposal, and spill response for hazardous materials under this alternative are unknown, the No Action/No Project Alternative could result in a direct and adverse impact.

Both the proposed Project and Alternative 1 would have a negligible potential to degrade the safety and stability of Littlerock Dam, and neither alternative is expected to result in Dam failure. Similarly, the proposed Project, Alternative 1, and the No Action/No Project Alternative would have a negligible potential to increase exposure of the public to Valley Fever or to high levels of mercury in fish caught for human consumption. Impacts to highway safety from the proposed Project, Alternative 1, and the No Action/No Project Alternative would be negligible.

C.14.6 Hydrology

The proposed Project and Alternative 1 would have an indirect and minor potential for reducing groundwater levels in the Antelope Valley Groundwater Basin that would be offset by reduced need for groundwater extraction by PWD. By comparison, the No Action/No Project Alternative would, over a period of decades (possibly shorter if catastrophic sedimentation occurs in the reservoir due to fire or other watershed changes), substantially increase reliance on groundwater for local municipal use.

The Project and Alternative 1 would both reduce downstream flooding by increasing reservoir storage capacity, and maintaining that capacity for the future. The No Action/No Project Alternative would, over time, result in reduced reservoir capacity with a corresponding increase in downstream flood potential.

C.14.7 Noise

Noise impacts associated with the proposed Project and Alternative 1 would be similar. While Alternative 1 would reduce the number of daily truck trips and an overall reduction in temporary noise occurrences, the total number of days that activities would generate noise is increased (into the months of July and August). Both the Project and Alternative 1 would implement SPC NOI-1 (Prepare a Construction Noise Complaint and Vibration Plan) and SPC NOI-2 (PWD Site Buffer Requirements) to minimize adverse impacts. The No Action/No Project Alternative, while having somewhat unknown construction specifics, would likely result in increased noise impacts when compared to both the Project and Alternative 1.

C.14.8 Recreation and Land Use

The proposed Project, Alternative 1, and the No Action/No Project Alternative would comply with applicable federal, State, and local land use or recreation plans, goals, policies, or regulations. This

includes consistency with the 2005 Forest Service's Land Management Plan as well as local zoning requirements for storage or disposal of excavated sediment.

Neither the proposed Project nor the alternatives would expand existing recreational facilities nor would they convert NFS lands. However, the Project and Alternative 1 would temporarily preclude existing recreational resources at the Reservoir (Impact L-1). Under the Project and Alternative 1, the Reservoir and surrounding area would be closed annually for several months each year, but would generally be open to the public during the winter and spring months assuming that the Forest Service re-opens the Reservoir for public access. Compared with the proposed Project, Alternative 1 may double the number of years that the Reservoir would be closed to the public, and would include annual closures during the peak summer period. The No Action/No Project Alternative would not involve any construction or sediment excavation as part of the proposed management of the Reservoir, and therefore would not create a short-term disturbance of recreational resources within the Study Area.

The proposed Project, Alternative 1, and the No Action/No Project Alternative would disturb existing land uses along the dump truck routes and disposal sites (Impact L-2). Approximately 480 truck trips per day would be required under the Project, while the reduced construction schedule under Alternative 1 would require a smaller number of 180 truck trips per day. A removal of the Dam and accumulated sediment, which may be required under the No Action/No Project Alternative, could involve excavation of up to 2.8 million cubic yards of sediment and Dam concrete, which is almost twice the amount of sediment to be excavated than under the Project.

The Project and Alternative 1 would restore the Reservoir to its 1992 design capacity, and consequently would not contribute to the long-term loss or degradation of recreation at the Reservoir. The No Action/No Project Alternative would limit the future water-based recreational opportunities within the Study Area due to the reduction of Reservoir capacity from annual sediment accumulation, and may result in the permanent closure of the Reservoir if the Dam were to be removed (Impact L-3).

C.14.9 Transportation and Traffic

The proposed Project would create an adverse impact at the intersection of Pearblossom Highway and Avenue T during the afternoon peak hour. Traffic impacts associated with Alternative 1 would be less than the proposed Project, because traffic delays at the stop sign on the northbound intersection of Cheseboro Road at Pearblossom Highway would be reduced under Alternative 1. While Alternative 1 would reduce the number of daily truck trips and reduce the afternoon peak period impact at the intersection of Pearblossom Highway and Avenue T compared to the proposed Project, the delay at this intersection would remain significant when compared to baseline operating conditions. Both the proposed Project and Alternative 1 would require identical mitigation to reduce adverse impacts. The No Action/No Project Alternative, while having somewhat unknown construction specifics, could result in increased traffic impacts when compared to both the proposed Project and Alternative 1 in the event that 2.8 million cubic yards of sediment and Dam debris would need to be removed.

C.14.10 Visual Resources

Visual resource impacts associated with the proposed Project and Alternative 1 would be identical. Both the Project and Alternative 1 would not result in adverse impacts. The No Action/No Project Alternative, because it results in unknown compliance with future SOI determination of the Reservoir by the Forest Service and would result in somewhat unknown construction specifics, is considered to result in increased visual resource impacts when compared to both the proposed Project and Alternative 1.

C.14.11 Water Quality and Resources

The proposed Project and Alternative 1 would have a direct and minor potential to introduce hazardous materials to receiving waters. This potential would be minimized through implementation of SPC WQ-1 (Prepare Spill Response Plan) and SPC HYDRO-1 (Fill From Reservoir Excavation Will Not Be Placed in Stream Channels). No other adverse impacts to surface water quality would occur. Under the No Action/No Project Alternative, a future Dam breach or demolition would result in substantial downstream erosion and sedimentation. As it is unknown what project commitments would be included in this alternative, or if they would be adequate to protect downstream resources from degradation, the No Action/No Project Alternative would result in a direct and adverse impact.

The proposed Project, Alternative 1, and the No Action/No Project Alternative would have a negligible potential to introduce hazardous materials to the groundwater basin, and none of the alternatives are expected to degrade groundwater quality.

C.14.12 Wildfire Prevention and Suppression

The components of the proposed Project and Alternative 1 that could affect wildfire prevention and suppression are similar enough to result in identical impacts. Both the Project and Alternative 1 would utilize equipment staging areas at the Project Area, and would transport excavated sediment along Forest Service and public roadways. In order to avoid accidental fire ignition or interference with wildfire suppression activities, both the proposed Project and Alternative 1 would implement SPC FIRE-1 (Curtailment of Activities), SPC FIRE-2 (Preparation of a Fire Plan), and SPC FIRE-3 (Spark Arrester Requirements).

Restoration activities that are proposed under the proposed Project and Alternative 1 are also identical. With the implementation of SPC BIO-1a (Provide Restoration/Compensation for Impacts to Native Vegetation Communities) and SPC BIO-2 (Prepare and Implement a Weed Control Plan) to minimize the effects of construction activities on native flora, neither the Project nor Alternative 1 would create a fuel vegetation matrix with an increased ignition potential and rate of fire spread.

Under the No Action/No Project Alternative, future Dam removal would require a greater construction effort than the proposed action or Alternative 1. Under this scenario, the No Action/No Project Alternative would likely introduce a larger temporary workforce that would need to be trained in fire prevention behavior and protocols. These activities at the Reservoir may result in an increased potential for wildfire risk when compared to the proposed Project and Alternative 1

Table C.14-1. Comparison of Impacts by Alternative

Resource	Proposed Action	Alternative 1	No Action/ No Project Alternative (Alternative 2)	NFS Lands Affected
Air Quality and Climate Change	Average daily PM10 emissions would exceed the AVAQMD emissions thresholds during excavation (Impact AQ-2). Operation air pollutant emissions estimates are below the AVAQMD emissions thresholds (Impact AQ-3). GHG emissions are below AVAQMD GHG emission thresholds (Impact GHG-1).	All construction and operation air pollutant emissions estimates are below the AVAQMD emissions thresholds (Impacts AQ-2 and AQ-3). GHG emissions are below AVAQMD GHG emission thresholds, but would be slightly higher than for the proposed action due to the higher efficiencies associated with the proposed action's higher daily volume sediment hauling (Impact GHG-1).	Air pollutant emissions from eventual Dam removal construction activities may exceed AVAQMD emissions thresholds. The hauling and disposal of sediment and Dam debris that may result from dam removal would generate GHG emissions similar to, but likely greater in quantity, than that of the proposed action or Alternative 1.	Yes
Biological Resources	The proposed action would incorporate SPCs to avoid and/or minimize adverse effects on: • Riparian habitat or other sensitive natural community (Criterion BIO1); • Fully protected, endangered, or threatened species (Criterion BIO2); • Candidate, sensitive, or special-status species (Criterion BIO3); • Federally protected wetlands (Criterion BIO4); and • Migratory species or wildlife corridors (Criterion BIO5).	Extended construction schedule would increase the likelihood of disturbing nesting birds and disturbing pupping season for ringtail (Criterion BIO2). Draining the Reservoir earlier in the season may have greater impacts to arroyo toads (Impact BIO-6).	Eventual removal of sediment and demolition of the Dam would involve an intensive construction effort that would create greater impacts to biological resources above and below the Dam (i.e., native vegetation, wildlife, jurisdictional resources) than would occur from the proposed action or Alternative 1.	Yes
Cultural Resources	The proposed action would incorporate SPCs to avoid and/or minimize adverse effects on cultural resources (Impacts C-1 and C-2).	Alternative 1 would incorporate identical SPCs as the proposed action, and would avoid and/or minimize adverse effects on cultural resources (Impacts C-1 and C-2).	In the event that removal of sediment and demolition of the Dam were to occur, it is likely that SPCs similar to the proposed action would be implemented to avoid and/or minimize adverse effects on cultural resources.	Yes
Geology and Soils	The proposed action would incorporate SPCs to avoid and/or minimize adverse effects due to seismic or geologic hazards (Impact G-1), or from soil erosion, slope instability, or slope failure (Impact G-2).	Fewer workers would be exposed to risks associated with unstable slopes than under the proposed action, but risks would occur over a longer period of time (Impact G-1). Soil disturbance would be less than under the proposed action, but would occur over a longer period of time (Impact G-2).	Demolition of the Dam and sediment removal would involve more earth movement than under the proposed action, and may require working on or near steeper slopes. Direct impacts to soils and risks to construction workers may be greater than under the proposed action or Alternative 1.	Yes
Hazards and Public Safety	The proposed action would incorporate SPCs to avoid and/or minimize adverse effects to public health, including risk from hazardous material spills (Impact HAZ-1) or unsafe highway conditions (Impact HAZ-5).	Fewer workers would be exposed to risks associated with hazardous materials, but risks would occur over a longer period of time (Impact HAZ-1). Fewer disposal trucks would be utilized, which	Excavation and demolition of the Dam would require the use of hazardous materials that may contribute to soil, groundwater, or surface water contamination. As the degree to which SPCs would be incorporated into this future	Yes

Table C.14-1. Comparison of Impacts by Alternative

Resource	Proposed Action	Alternative 1	No Action/ No Project Alternative (Alternative 2)	NFS Lands Affected
		could lead to a slight reduction in unsafe highway conditions (Impact HAZ-5).	project is unknown, impacts may be greater than under the proposed action or Alternative 1.	
Hydrology	The proposed action would incorporate SPCs to avoid and/or minimize adverse effects associated with groundwater supply, erosion and siltation, or flooding (Criteria H1 through H3).	Alternative 1 would incorporate identical SPCs as the proposed action to avoid and/or minimize adverse effects associated with groundwater supply, erosion and siltation, or flooding (Criteria H1 through H3).	May contribute to a decline in groundwater levels from a greater reliance on alternative water sources (i.e., groundwater and State Water Project) (Impact H-1). Loss of water storage capacity in the Reservoir would increase the risk of flood hazard downstream of the Dam (Impact H-3).	Yes
Noise	The proposed action would incorporate SPCs to avoid and/or minimize adverse noise impacts from mobile and stationary sources (Impacts N-1 and N-2), and to minimize impacts to sensitive receptors (Impacts N-3 and N-4).	Reduction in daily truck trips would reduce the amount of mobile noise occurring per day, but would increase the overall number of days per year that noise is generated (Impact N-1). Reduction in daily truck trips would reduce the overall daily frequency of potential vibration, but would increase the number of days where temporary vibration may be generated (Impact N-4).	Excavation and demolition of the Dam would generate construction noise. As the degree to which SPCs would be incorporated into this future project is unknown, impacts may be greater than under the proposed action or Alternative 1.	Yes
Recreation and Land Use	After the Project's initial construction and excavation during the summer and fall of the first year, annual closure of the Reservoir would occur after Labor Day until mid-November to January, for a minimum of 7 years up to 12 years (Impact L-1). Truck trips would create nuisance impacts to nearby residences (Impact L-2).	Construction and excavation would require annual closure of the Reservoir during the peak summer period (beginning July 1st of each year until mid-November to January) for a minimum of 13 years (Impact L-1). Reduction in daily truck trips would lessen the daily nuisance impacts to nearby residences, but would lengthen the time that disturbances would occur (Impact L-2).	Future excavation and demolition of the Dam would require an intensive construction effort that would create greater disturbances to residences along the truck routes and disposal sites than under the proposed action or Alternative 1 (Impact L-2). Removal of the Dam would result in the irreversible loss of a recreational resource (Impact L-3).	Yes
Transportation and Traffic	Number of truck trips would be 480 trips (240 round trips). Truck traffic under the proposed action would adversely affect the intersection of Pearblossom Highway and Avenue T (Impact T-1). The proposed action would create excessive traffic delays at the stop sign on northbound Cheseboro Road at Pearblossom Highway (Impact T-1).	Number of truck trips would be reduced to 180 trips (90 round trips). No adverse impact would occur at the intersection of Pearblossom Highway and Avenue T (Impact T-1). Traffic delays at the stop sign on northbound Cheseboro Road at Pearblossom Highway would still occur, but impacts would be reduced (Impact T-1).	Future excavation and demolition of the Dam would require an intensive construction effort that would involve a greater number of truck trips than under the proposed action or Alternative 1.	Yes

Table C.14-1. Comparison of Impacts by Alternative

Resource	Proposed Action	Alternative 1	No Action/ No Project Alternative (Alternative 2)	NFS Lands Affected
Visual Resources	The proposed action would not greatly alter the existing visual landscape and would avoid adverse effects on visual resources (Criteria VIS1 and VIS2).	Alternative 1 would be identical to the proposed action in that it would not greatly alter the existing visual landscape and would avoid adverse effects on visual resources (Criteria VIS1 and VIS2).	In the event that the Reservoir became filled with sediment, construction of a downstream flood-control channel may be required. Future flood control facilities could result in visual contrast and adverse visual impacts.	Yes
Water Quality and Resources	The proposed action would incorporate SPCs to avoid and/or minimize adverse effects associated with waste discharge and hazardous material spills (Impacts WQ-1 and WQ-2).	Alternative 1 would incorporate identical SPCs as the proposed action to avoid and/or minimize adverse effects associated with waste discharge and hazardous material spills (Impacts WQ-1 and WQ-2).	In the event that the Dam would be breached or demolished, downstream erosion and sedimentation would occur. As the degree to which SPCs would be incorporated into this future project is unknown, impacts may be greater than under the proposed action or Alternative 1.	Yes
Wildfire Prevention and Suppression	The proposed action would incorporate SPCs to avoid and/or minimize interference with wildfire suppression activities or risk of wildfire ignition (Impacts WF-1 through WF-3).	Alternative 1 would incorporate identical SPCs as the proposed action to avoid and/or minimize interference with wildfire suppression activities or risk of wildfire ignition (Impacts WF-1 through WF-3).	In the absence of construction or excavation activities, no impacts or conflicts with fire prevention and suppression activities would occur. However, In the event that the Dam would be demolished, Alternative 2 would incorporate identical SPCs as the proposed action to avoid and/or minimize interference with wildfire suppression activities or risk of wildfire ignition (Impacts WF-1 through WF-3).	Yes